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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,944	11/14/2003	Takaei Sasaki	101136-00103	7420

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EXAMINER

KORNAKOV, MICHAEL

ART UNIT

PAPER NUMBER

1746

DATE MAILED: 09/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/706,944

Applicant(s)

SASAKI ET AL.

Examiner

Michael Kornakov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 07 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/361,158.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because the abstract is drawn to reflect the invention of the "method", while the instant claims call for the apparatus. Correction is required. See MPEP § 608.01(b).
 2. Rejection of claims 19 and 20 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, is withdrawn in view of Applicants' remarks. However, the lengthy recitations or details of the article worked upon in the apparatus, and of the process that is performed in the claimed apparatus do not effect the scope of the claimed invention in terms of structural elements of apparatus.
 3. Claims 19 and 20 are currently amended to introduce additional structural element of the claimed apparatus, namely the "source of etching gas".
 4. The rejections over the reference to Cohen (U.S. 6,610,151) is withdrawn in view of Applicants' remarks.
 5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
 6. Claims 19 and 20 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Loan.
- In Loan:*** A system for governing the supply of various precursors to a cluster tool 120 having one or more vaporization chambers 26 is illustrated in FIG. 2c. A cluster tool controller 802 is controlled by a programmable host computer or data processor 804,

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which sends high-level commands to a process module to govern the deposition process, including regulation of the delivery of precursors 806, 808, 810 for the deposition of titanium nitride, copper, and aluminum, respectively, for example. The cluster tool controller 802 is further programmed by the host computer 804 to regulate a pair of modules for annealing/diffusion 812, 814 and a separate module for pre-heating and pre-cleaning 816. Communication between each of these modules 806, 808, 810, 812, 814 and 816 and the cluster tool controller 802 is facilitated by provided architecture. The apparatus is used for dry etching process. In the apparatus of Loan the use of **oxygen gas** is acknowledged, and also **hydrogen gas** is used to enhance the process. Means are provided in the apparatus for introducing such reactants (hydrogen gas) or process-assisting agents through a separate gas line (col.30, lines 18-25).

Thus all structural elements of the apparatus as presently claimed are present in the disclosure of Loan. With regard to the gases that are provided by a gas source, as per instant claims, since the structural elements of Loan's apparatus are the same as claimed, and are configured to supply hydrogen, oxygen and other process assisting agents, they are fully capable of supplying the gas mixture as instantly claimed.

The configuration and nature of the substrate worked upon by the apparatus claimed in this invention is not patentable in view of *In re* Young (25 U.S.P.Q. 69, 71 (CCPA 1935)) and *In re* Rishoi (94 U.S.P.Q. 71,73 (CCPA 1952)). The Court of Customs and Patent Appeals stated in *In re* Young that inclusion of material worked upon by a machine as element in claim may not lend patentability since claim is not

otherwise allowable. Similarly, the Court of Customs and Patent Appeals stated in *In re* Rishoi that there is no patentable combination between a device and the material upon which it works.

In the alternative the rejection is made under 35 USC103 (a), in the sense that even if not taught by Loan the source of gas for supplying particular mixture of gases as instantly claimed. However, Loan clearly suggests to those skilled in the art that in addition to hydrogen gas other process assisting agents are supplied through gas source means. It would have been obvious to those skilled in the art to add any additional gas source, capable of holding aggressive gaseous ingredients, among them the source capable of holding chlorine gas, if needed, in order to perform a certain processing task in apparatus of Loan with the reasonable expectation of success.

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Loan in view of Ke et al (U.S. 6,284,093) and in view of Hasegawa et al (U.S. 5,554,249).

Loan fails to disclose the following aspects of Applicant's claimed invention:

- the specific usage of four electromagnets which surround the etching chamber and produce a magnetic field, which can rotate in a plane parallel to a substrate when a low frequency current which is 90 degrees out of phase is applied to the electromagnets; and
- a transport robot which can be used to transport the wafer to, and from the transport chamber.

Ke et. al. teach that it is desirable to employ four electromagnets which surround etching chamber to produce a magnetic field which can rotate in a plane parallel to a substrate to be etched in order to enhance the uniformity of the etching across the face of the substrate to be etched. They form the magnetic fields by applying to the electromagnets coils a low frequency current which is 90 degrees out of phase. This is discussed specifically in column 15, and discussed in general in columns 1-26. This is shown specifically in figure 9, and shown in general in figures 1-11.

Hasegawa et. al. teach that it is desirable to use a two joined transport robot with two knots to move a wafer between a transport chamber, and a etching chamber. This is discussed specifically in columns 3-8, and discussed in general in columns 1-12. This is shown specifically in figure 7, and shown in general in figures 1-8.

It would have been obvious to one skilled in the art to employ the electromagnetic field generation means taught by Ke et. al. in the apparatus taught by Loan based upon the suggestion of Ke that it is desirable to do so in order to enhance the uniformity of the etching of a substrate.

It would have been also obvious to one skilled in the art to employ the robotic transport, and load-lock chamber means taught by Hasegawa et. al. in the apparatus taught by Loan based upon the suggestion of Hasegawa that it is desirable to do so to enhance the through put of wafers to be etched in the apparatus taught above.

8. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grill "Plasma in Materials Fabrication", IEEE PRESS, 1993, pages 105, 110, 11 (hereinafter referred to as Grill).

Grill describes cluster tool apparatus for dry etching shown in Fig.4-22, which contains multiple process modules that are arranged around the central core, wherein each processing unit can have its own control system.(pages 110,111). Grill does not specify that the control can be a computer control. However, automation of a previously known operation by use of a conventional control is within the skill of those ordinary skilled in the art, *In re Venner*, 120 USPQ 193 (CCPA 1958). With regard to the source of etching gases, as instantly amended claims call for, Grill teaches that the routinely used dry etching apparatuses must have the source of gases in order to be capable of performing the processing tasks, such sources are shown in Fig.4-1 on page 86 and table 4-1 on page 88.

To provide the source of specifically named gases is within the skill of those ordinary skilled in the art.

In specific regard to claim 20, Grill describes the cluster tool, having multiple processing units, such as etching chamber, substrate holder (cassette), as discussed above, and further shows the arrangement of four electromagnets , each made of a ring-like coil arranged at 90°, and provided on the outer side of the chamber (see Fig.4-20 on page 108). With regard to the transport robot, the central handling platform (Fig.4-22 on page 111) can be very well computerized as being a transport robot, and is such computerization is within the skill in the art, as discussed above.

It is the Examiner's position, that Grill does not specifically teach the usage of applicant's claimed process in his apparatus since the apparatus of Grill includes the structural elements identical to those instantly claimed and, therefore, is fully capable of conducting Applicants' claimed process.

Response to Arguments

9. Applicants' arguments filed 06/07/2004 have been fully considered but they are not persuasive.

Applicants arguments reside in contention that none of the cited references teach or suggest the source of gases as appears in the instantly amended claims. In response to this Applicants' attention is drawn to the disclosure of Loan, col.39, lines 20-25, wherein the source of gas is described. The ability of this source or means to supply specific gases is addressed above.

Additionally, Applicants argue that while Ke et al. is cited to show four electromagnets which surround an RIE etching chamber, Ke et al. nowhere teach or suggest a source of either of the two combinations of gases now required by claim 20. Similarly, Hasegawa et al., which is cited to show a two jointed robot, do not teach or suggest a source of either of the two combinations of gases now required by claim 20.

In response to this it is noted that neither Ke, nor Hasegawa are used to remedy the alleged deficiency of gas source, because the gas source is present in the disclosure of Loan.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

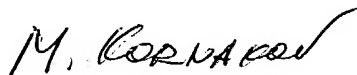
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael Kornakov
Primary Examiner
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09/02/2004